A Work Project, presented as part of the requirements for the Award of a Master's degree in Finance and Management from the Nova – School of Business and Economics.

Understanding the aviation industry and its global impact: why are airlines destroying shareholder value and how do they contribute to the world economy?

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3rd of January, 2020

A Project carried out on the Master in Finance and Management under the supervision of: Professor Miguel Pita

Why are airlines destroying shareholder value and how do they contribute to the world economy?

Abstract

1. Which segment is the main driver of the aviation industry and what are the characteristics of full-service and low-cost carriers?

2. Why is the aviation industry destroying shareholder value?

3. What are the spillovers of the aviation industry?

4. Scalability: a new challenge for the future

Keywords: commercial passenger airlines, destruction of shareholder value, spillovers & scalability

This work used infrastructure and resources funded by Fundação para a Ciência e a Tecnologia(UID/ECO/00124/2013, UID/ECO/00124/2019 and Social Sciences DataLab, Project 22209), PORLisboa (LISBOA-01-0145-FEDER-007722 and Social Sciences DataLab, Project 22209) and PORNorte (Social Sciences DataLab, Project 22209).

Why are airlines destroying shareholder value and how do they contribute to the world economy?

Executive summary

1. Which segment is the main driver of the aviation industry and what are the characteristics of full-service and low-cost carriers?

- The commercial passenger airlines segment – full-service carriers (FSCs) and low-cost carriers (LCCs) – is the main driver of the industry due to its highest value and volume
- From the segment analysis conducted it is apparent that FSCs focus on providing the best services to attract customers looking for a reliable and comfortable airline which is achieved through differentiation. On the other hand, LCCs make every effort to provide the cheapest service to attract price-sensitive customers through cost leadership
- Furthermore, a Porter's Five Forces analysis concluded that airline's bottom line is squeezed due to powerful suppliers

→ The main driver of the aviation industry has been identified, it is now crucial to analyse why the industry is destroying shareholder value

2. Why is the aviation industry destroying shareholder value?

- This chapter reveals that four factors lead to aviation's low profitability – Threatening Forces, Volatile Cost Structure, Strategic Decisions and Legislation
- By analysing the problem through three different perspectives – 1) Value Chain, 2) Operations and Strategy and 3) Profitability – key success factors (KSFs) are uncovered
- Aviation presents one of the worst returns on invested capital (ROIC) amongst industries and a big dispersion between best and worst performers occurs due to six factors

→ If this industry destroys $18.2 billion per year, why is money still being invested?

3. What are the spillovers of the aviation industry?

- Aviation plays a decisive role in driving global economic growth and contributed with just under $1.8 trillion to global GDP in 2016, generating approximately 29 million jobs. Together with tourism, these industries provided 65 million jobs and its economic contribution represented 3.5% of global GDP in 2016
- As a driver of sustainable development, global aviation contributes to businesses as well as the health and general well-being of people
- The negative environmental impacts of aviation and climate change are the main sources of concern and a growing risk threatening the operations and economic profitability of the aviation industry

→ It is now important to understand the challenges the aviation industry will face in the future and how they can be solved

The commercial passenger airlines segment is the main driver of the aviation industry, with the industry as a whole experiencing shareholder value destruction of $18.2 billion per year due to four factors. Nonetheless, it has a crucial role as a driver of economic growth valued at $2.7 trillion, which ultimately results in a overwhelming net positive contribution to the world economy.

Why are airlines destroying shareholder value and how do they contribute to the world economy?

Executive summary

4. Scalability: a new challenge for the future

- From the previous three chapters it is possible to conclude that the profitability issue within the aviation industry is intrinsic and of difficult resolve, however, the demand for air transport is expected to increase, further strengthening the aviation industry's impact on global GDP growth, generating jobs and driving private consumption
- This sheds light on a new issue: scalability. For which fleet, infrastructure and labour will need to be reinforced to allow the industry to capture the increasing demand in air travel
- Ultimately, a customer journey approach can solve profitability and scalability issues as well as enhance the customer experience

Air transport demand is expected to increase 78% by 2035 and to absorb this growth the aviation industry needs to develop three drivers (fleet, infrastructure and labour). A customer journey approach can be conducted to solve profitability and scalability issues while simultaneously enhancing the customer experience.

A Work Project, presented as part of the requirements for the Award of a Master's degree in Management from the Nova – School of Business and Economics.

Which segment is the main driver of the aviation industry and what are the characteristics of the full-service and low-cost carriers?

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1. Which segment is the main driver of the aviation industry and how?

Executive summary

1A. Segmenting the industry

- The aviation industry had global revenues of $704 billion and employed 65 million people in 2016
- The aviation industry can be broken down into two main areas: freight and passenger transportation
- Freighters dominate the air freight transportation industry accounting for 90% of the revenues
- General aviation (private and recreational flying) is the private transport component of aviation
- Commercial aviation – full-service carriers (FSCs) and low-cost carriers (LCCs) – is the public transport component of aviation
- The commercial aviation segment has a value of $728 billion and volume of 2.2 trillion revenue passenger kilometres (RPK) in 2018

1B. Commercial passenger airlines analysis

- The commercial passenger airlines industry analysis conducted will focus on three key components
- FSCs offer several services to enhance the customer experience which results in a higher price, while LCCs focus exclusively on offering low prices which comes at the cost of very limited services offered
- Commercial passengers can be divided into four segments: efficiency, comfort, price and performance
- FSC customers look for efficiency and comfort with travel agencies organising their travel plans, while LCC customers are price conscious since they organise and book the flights themselves
- FSCs follow differentiated marketing through the high quality and number of services offered, while LCCs follow cost leadership which is achieved by constantly pursuing operating cost reductions

1C. Key success factors

- FSC average price is $112 more expensive but LCCs are slightly more punctual
- Porter's Five Forces analysis main conclusion is that airline bottom line is squeezed due to powerful suppliers

The commercial passenger airlines segment is the main driver of the aviation industry with global revenues of $728 billion and 2.2 trillion revenue passenger kilometres in 2018. Within this segment, full-service carriers (FSCs) focus on providing the best services to attract customers looking for a reliable and comfortable airline which is achieved through differentiation, while low-cost carriers (LCCs) focus on providing the cheapest service to attract price-sensitive customers through cost-leadership.

1A. The aviation industry had global revenues of $704 billion and employed 65 million people in 2016

Technological innovation and regulatory changes have increased the size and profitability of the industry

The aviation industry

- Civil **aviation industry** is defined as the global network of aircraft operators, airports, air navigation service providers and manufacturers of aircraft and their components
- It is responsible for connecting the global economy, providing millions of jobs and making the modern, internationally connected way of life possible
- It has grown over the years and is today an important driver of economic growth

Brief history of the aviation industry

- In the late 18th century the first flight attempts were held with lighter-than-air flight using hot-air balloons designed by the Montgolfier brothers
- Followed by un-powered heavier-than-air flight with gliding by Otto Lilienthal in the late 19th century
- Powered flight only started in the beginning of the 20th century with the construction of the first powered aircraft by the Wright brothers
- Since then, the aviation industry has been technologically revolutionized with the introduction of the jet, becoming a viable and important form of transportation around the world

Key facts and figures in 2016*:

$704 billion – Aviation global revenue

45 091 – Routes served globally in 2017

3.5% – Global GDP supported by aviation

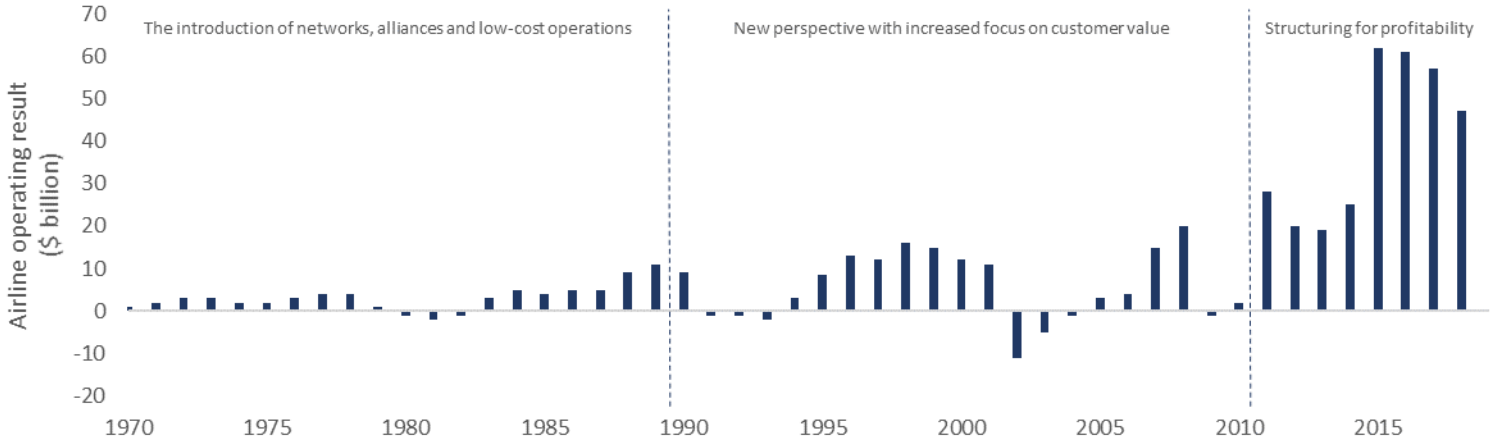
85 million – Hours flown by airlines in 2018

65 million – Jobs supported by aviation and tourism worldwide

54 billion – Kilometres flown by airlines in 2018

*Unless otherwise stated

Only after the deregulation and the development of efficient jets did profitability start to rise:



Historical airline operating result (approximate figures)

Source: Airbus

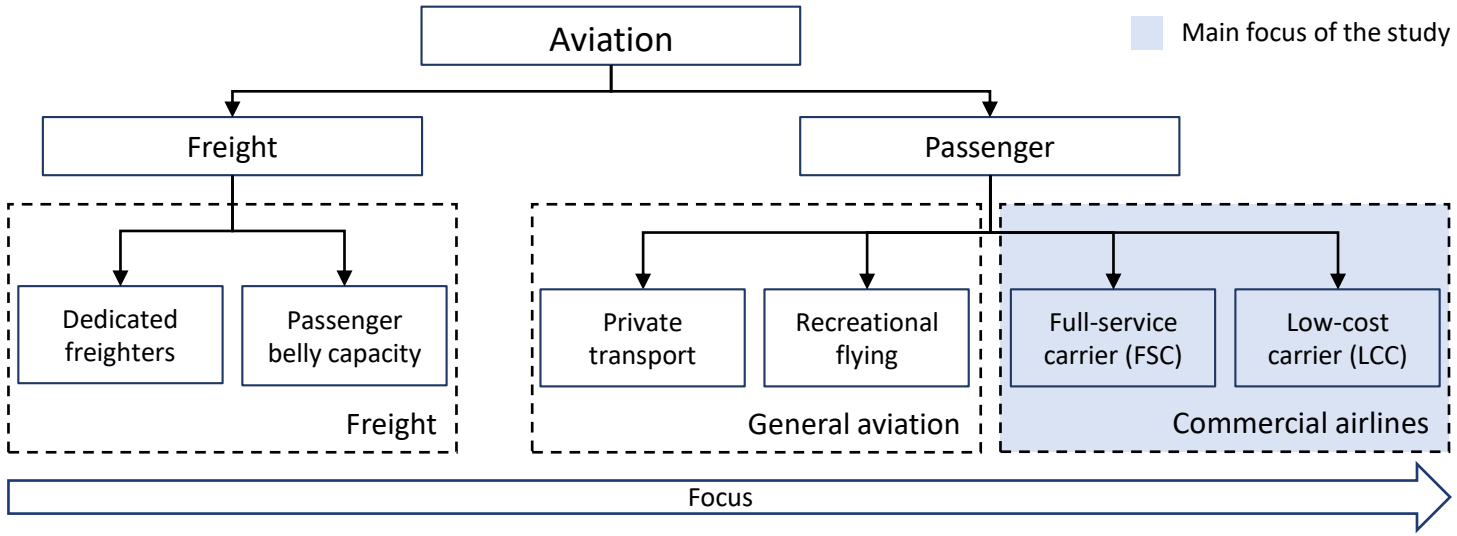
Sources: [1] ATAG; [2] Wittmer et al.; [3] Airbus

1A. The aviation industry can be broken down into two main areas: freight and passenger transportation

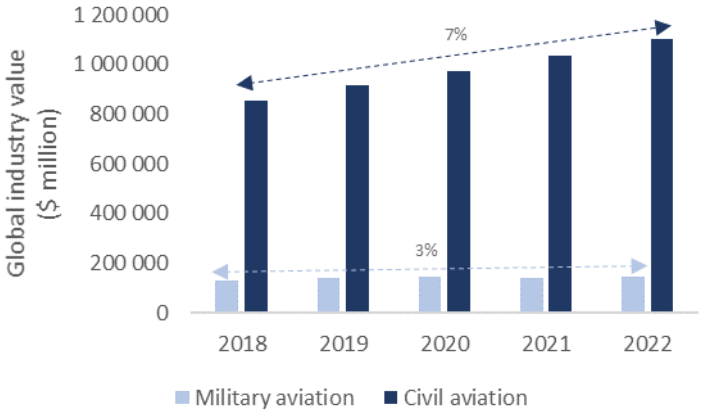
Civil aviation industry has a more significant impact on the global economy compared to military aviation

The aviation industry structure

- The aviation industry has two main pillars: **civil aviation** and **military aviation**
- Due to the very different nature of these two industries and the higher global industry value for civil aviation (as shown below) only civil aviation is within the scope of this study
- The structure of the civil aviation industry is presented on the right and the first breakdown is between the transport of **freight** and **passengers**



Civil aviation is far more valuable than military aviation:



Civil and military aviation global industry value

Source: MarketLine

Freight

- Operating of aircraft to transport goods
- Can be further divided into: **dedicated freighters** and **passenger belly capacity**
- The former includes the use of aircrafts which are solely used for the purpose of transporting goods
- The latter includes the use of spare volume in the luggage compartment of passenger aircrafts to transport goods

Passenger

- Operating of aircraft to transport people
- Can be further divided into: **general aviation** and **commercial aviation**
- The former is the private transport component of passenger aviation (**private transport** and **recreational flying**)
- The latter includes the public transport component of passenger aviation (**full-service carriers** and **low-cost-carriers**)

Sources: [1] ATAG; [4] MarketLine

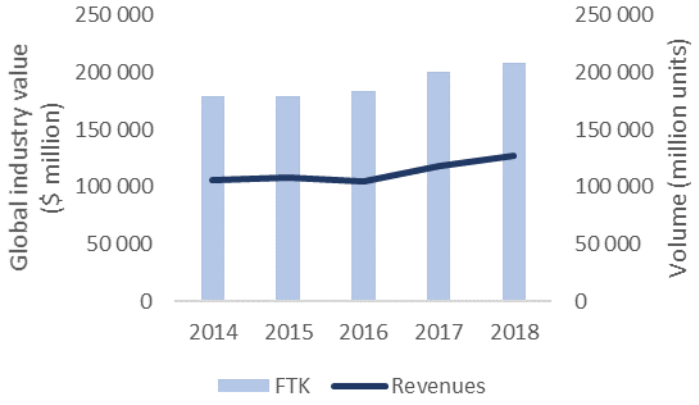
1A. Freighters dominate the air freight transportation industry accounting for 90% of the revenues

61.9 million tonnes of cargo were transported by air resulting in industry revenues of almost $120 billion in 2017

Freight

- **Air freight** is the transport of goods via aircraft
- It is the fastest mode for long-distance freight transport, however, it is also the most expensive
- It is especially valuable for individuals or companies which have urgency in receiving a particular good to satisfy customer needs or to help with inventory management
- Freight can be transported in two ways: through **dedicated freighters** or **passenger belly capacity**

Steady growth in value and volume of air freight transport:



Historical air freight revenues and freight tonne kilometres (FTK)

Source: MarketLine

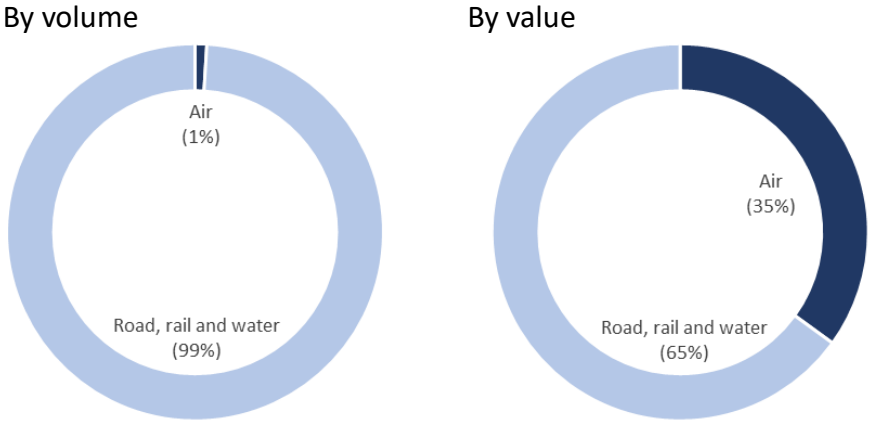
Key facts and figures in 2017:

$6 trillion – Value of cargo handled by air

61.9 million – Tonnes of freight handled by air

255 billion – Scheduled freight tonne kilometres

Air freight volume is low but of high value:



Volume and value of freight by transportation type (2017)

Source: ATAG

Dedicated freighters

- Involves the transport of goods by air in specialized freight aircraft
- Particularly well-suited for transporting high-value goods since they provide direct routing, unique capacity considerations, reliability and highly controlled transport
- Cargo aircrafts offer a higher value of service generating more than **90%** of the total air cargo industry revenue

Passenger belly capacity

- Involves the transport of goods by air in the belly capacity of passenger aircraft
- Extra space in this compartment is used for cargo to capitalize on additional revenue opportunities
- Volume of cargo transported is limited to the space available and include passenger networks which are much broader and often include destinations where cargo demand is minimal

Sources: [1] ATAG; [4] MarketLine; [5] Boeing

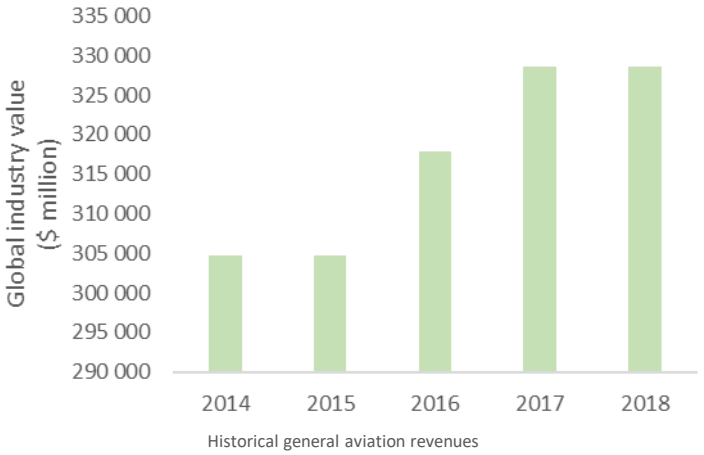
1A. General aviation (private and recreational flying) is the private transport component of aviation

Total revenues of almost $330 billion and employed 1.65 million people in 2018

General aviation

- **General aviation** is defined as all aviation other than military and commercial airlines
- It is the private transportation component of aviation and as such is usually expensive
- The type of aircraft can vary a lot depending on the activity and the number of people transported
- General aviation can be segmented into two areas: **private transport** and **recreational flying**

The increase in value from 2016 onwards is a result of the recovery from the financial crisis:



Historical general aviation revenues

Source: GAMA

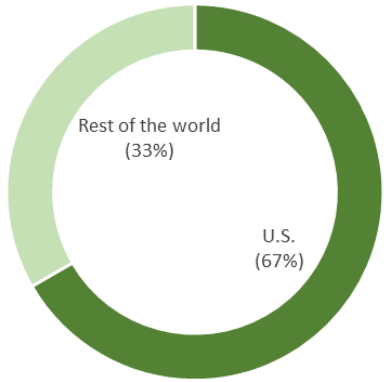
Key facts and figures in 2018:

$328.5 billion – Total revenues

446 thousand – General aviation aircraft flying

1.65 million – Jobs supported by general aviation

Two thirds of passenger traffic comes from the U.S.:



Passenger traffic distribution of general aviation by geography (2017)

Source: GAMA

Private transport

- This segment involves the transport of a small group of passengers in a business or private jet
- Aircraft activities include: corporate aviation, private charters, fractional ownership, and personal travel
- The type of aircraft used can be from a very light jet (max. 9 passengers) to a VIP airliner (max. 220 passengers)

Recreational flying

- This segment usually involves the transport of a single passenger for leisure or sports purposes
- Activities include: recreational flying (powered/powerless leisure flying activities) and air sports (aerobatics and air races)

Sources: [6] GAMA

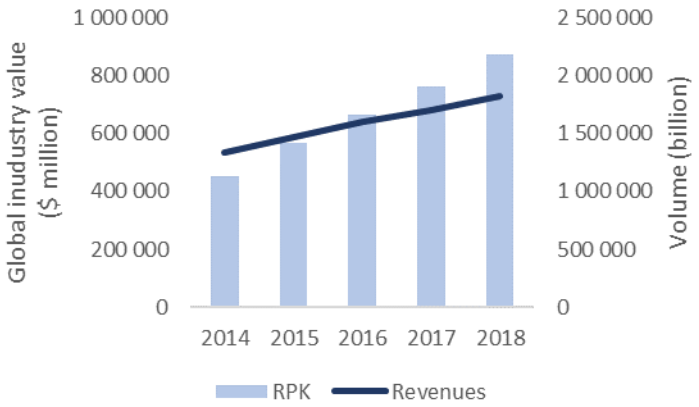
1A. Commercial aviation (full-service carriers and low-cost carriers) is the public transport component of aviation

Almost 9.5 billion passengers were transported resulting in revenues of $730 billion in 2018

Commercial passenger airlines

- **Commercial passenger airlines** is defined by the operating of aircraft to transport passengers
- It is the fastest mode for long-distance passenger transport and in some cases the only viable option
- Depending on the passenger's preferences there are several routes and airlines to choose
- Passengers can fly commercially in two ways: via **full-service** or **low-cost carriers**

Rapid growth in value and volume in the industry:



Historical commercial airline revenues and revenue passenger kilometres (RPK)

Source: MarketLine

Key facts and figures in 2017:

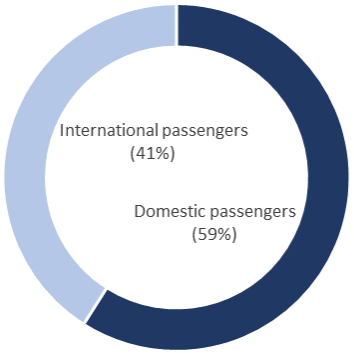
7.75 trillion – Passenger kilometres

4.1 billion – Passengers carried by airlines

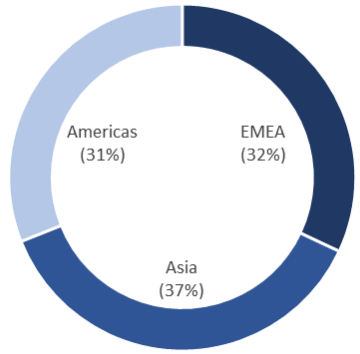
41.9 million – Commercial flights worldwide

Passenger traffic distribution is similarly split by region:

By global passenger split



By regional passenger split



Passenger traffic distribution of commercial airlines by geography (2017)

Source: ATAG

Full-service carrier (FSC)

- Involves the transport of passengers by air via full-service airlines
- Connect large sets of destinations through multiple hubs and typically have a core geographic market in which they are located
- These airlines offer transportation in all travel classes
- FSCs normally have the highest unit revenue as well as the highest cost structure

Low-cost carrier (LCC)

- This segment involves the transport of passengers by air via low-cost airlines
- LCCs typically provide only one travel class
- Are mainly focused on short and medium-haul markets
- Compete on cost leadership since they tend to have the lowest cost structure

Sources: [1] ATAG; [4] MarketLine

1A. The passenger commercial airlines segment has a value of $728 billion and volume of 2.2 trillion RPK in 2018

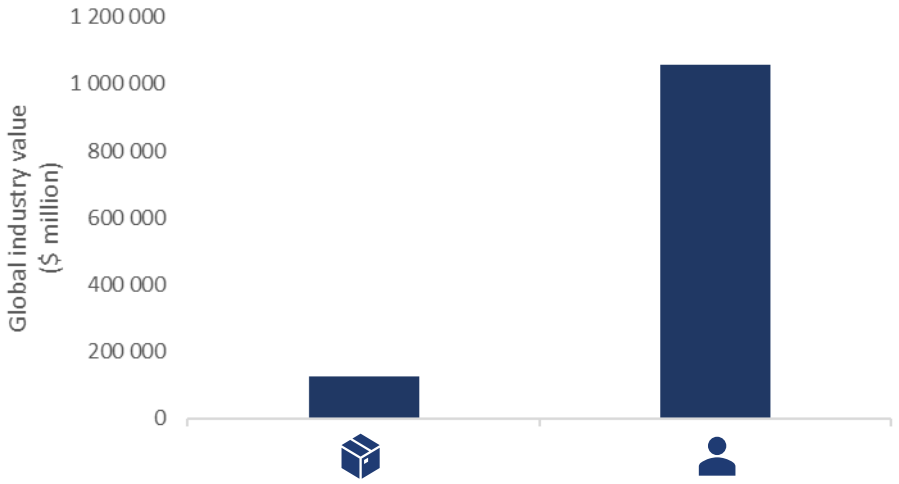
The focus of this chapter will be on the commercial passenger airlines since it represents the most significant share of the global revenues

Focus of the chapter

It is important to limit the focus of the chapter to the segment which is the most relevant within the overall aviation industry. When analysing the significance of a given segment within an industry it is critical to observe the respective value and volume – revenue passenger kilometres (RPK) or freight tonne kilometres (FTK).

In 2018, passenger aviation had the highest value and volume…

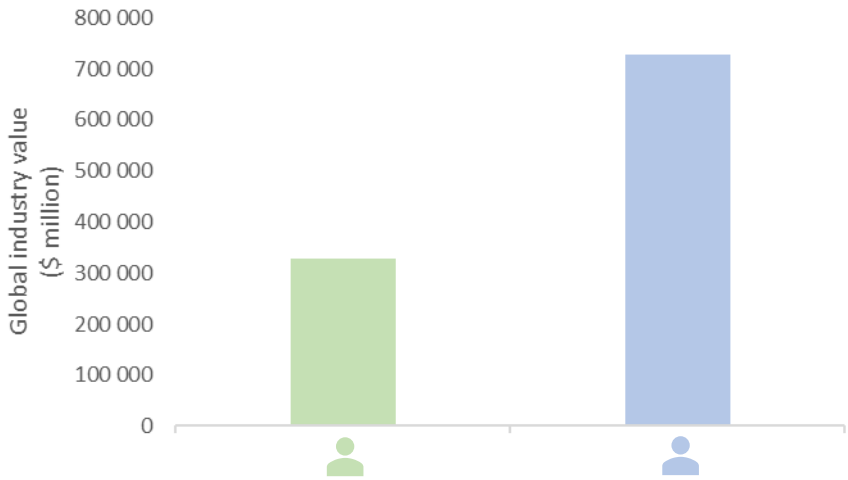
	Freight	Passenger
Value	**$127 billion**	**$1 trillion**
Volume	**208 billion FTK**	**2.2 trillion RPK**



Freight and passenger transportation global industry value (2018)

…where the commercial airlines segment was the driving force

	General aviation	Commercial airlines
Value	**$329 billion**	**$728 billion**
Volume	**NA***	**2.2 trillion RPK**



General aviation and commercial airlines global industry value (2018)

From the value and volume analysis conducted it is clear that the main driver of the aviation industry is the passenger aviation segment, more specifically, commercial passenger airlines and as such this segment will be the main focus of this chapter.

* No available public data for general aviation volume

Sources: [4] MarketLine; [6] GAMA

1B. The commercial passenger airlines industry analysis conducted will focus on three key components

The business model, customers & demand and marketing strategies will be identified for FSCs and LCCs

The commercial passenger airlines (FSCs and LCCs) will be analysed using the following framework:

Business model

- Network
- Operations & services
- Fare structure
- Key players

Customers & demand

- Customer segments
- Customer journey
- Demand volume
- Demand, ASK and PLF

Marketing strategies

- Marketing strategies
- Value proposition
- Perceptual mapping
- Positioning strategies

1B. FSCs offer several services to enhance the customer experience which results in a higher price…

FSCs made up 70% of the commercial passenger airlines industry resulting in a $477 billion market in 2017

Business model

The availability of connecting flights and the several services offered by the FSCs...

Network

Network structure:

Hub-and-spoke (HS):

+ Several origins and destinations relatively well interconnected with a low number of routes
- Congestion in hubs result in delays and increased turnover times of aircraft, raising airline unit costs

Multi-hub-and-spoke (MHS):

+ More flexible consolidation of traffic in hubs through connecting flights, obtaining an adequate load factor for large aircrafts and efficient flight frequencies
- Need to schedule a high rate of flights between multiple hubs

Geographical network range:

- Mix of short, medium and long-haul domestic and international flights

Operations & services

Aircraft operated:

- Different aircraft types from small regional feeder to a long range widebody aircraft

Services offered:

- Several services offered included in the base fair (e.g. in-flight meals, checked luggage, loyalty programs)

…translate into multiple travel classes and a higher price

Fare structure

Travel class:

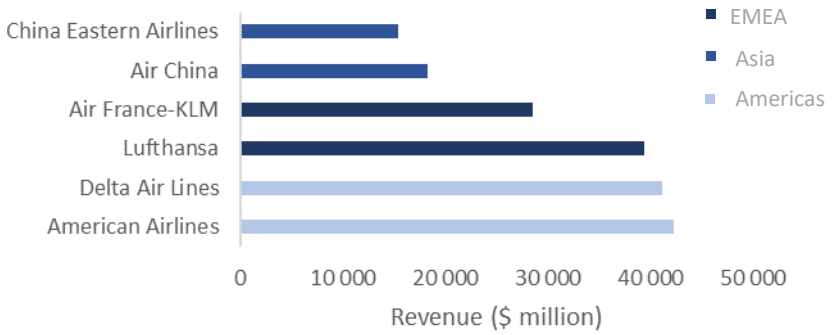
Economy class:

- The lowest travel class of seating in air travel

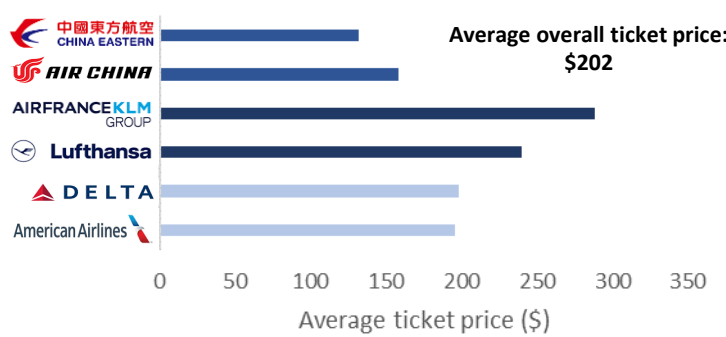
Business class:

- The highest level of service distinguished by the quality of seating, food, drinks, ground service and other amenities
- Business class prices are more expensive and can be up to double the price of the economy class

American FSCs generate the highest revenues while European FSCs are the most expensive:



FSC key players with the highest revenues by geography (2017)



Average ticket price of FSC key players (2017)

Source: Annual Reports

Sources: [7] Annual Reports; [8] Carmona-Benitez et al.; [9] Lordan; [10] DLR

…while LCCs focus exclusively on offering low prices at the cost of very limited services offered

LCCs made up 30% of the commercial passenger airlines industry resulting in a $205 billion market in 2017

Business model

The focus on short-haul flights and the limited services offered by LCCs...

Network

Network structure:

Point-to-point (PP)

+ Lower temporal density due to the non-existence of connecting flights
+ Lower probability of delays, lower peaks of needs of personnel and a lower turnover of aircrafts due to the low temporal density of operations
- Need to implement a much larger number of routes than the HS network to link a similar number of destinations
- Only operate on routes where demand is high enough to have a high load factor
- Limited to short and medium-haul flights since long-haul routes are usually out of reach

Geographical network range:

- Short and medium-haul domestic and international flights

Operations & services

Aircraft operated:

- Homogenous fleet of medium-sized aircraft with high density seating and high capacity utilization

Services:

- Very limited services offered by LCCs (e.g. food and drinks are only available for purchase at prices significantly exceeding typical market value – source of ancillary revenue)

…translate into a single travel class and a lower price

Fare structure

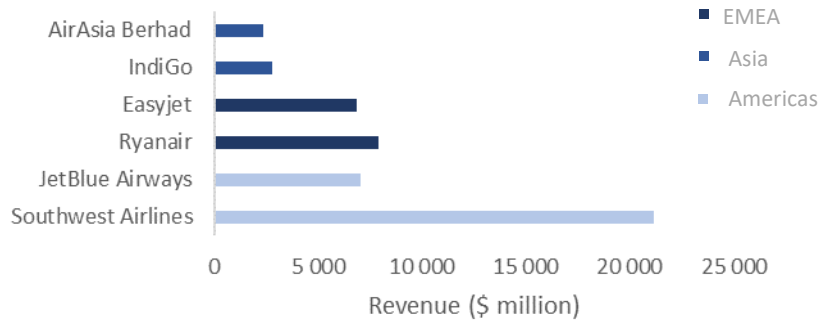
Travel class:

- LCC's usually have only a single service class so there is no price discrimination

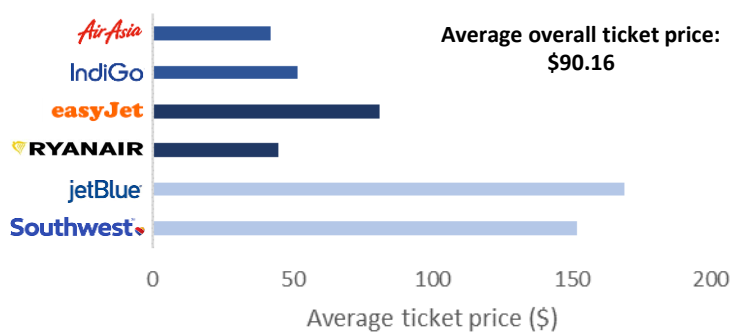
Pricing:

- Low fares are charged due to strong focus on price competition
- Very dynamic pricing with discounts and tickets in promotion

Southwest Airlines is the main driver of LCC revenue while Asian and European LCCs are the cheapest*:



LCC key players with the highest revenues by geography (2017)



Average ticket price of LCC key players (2017)

Source: Annual Reports

Sources: [7] Annual Reports; [8] Carmona-Benitez et al.; [9] Lordan; [10] DLR

1B. Commercial passengers can be divided into four segments: efficiency, comfort, price and performance

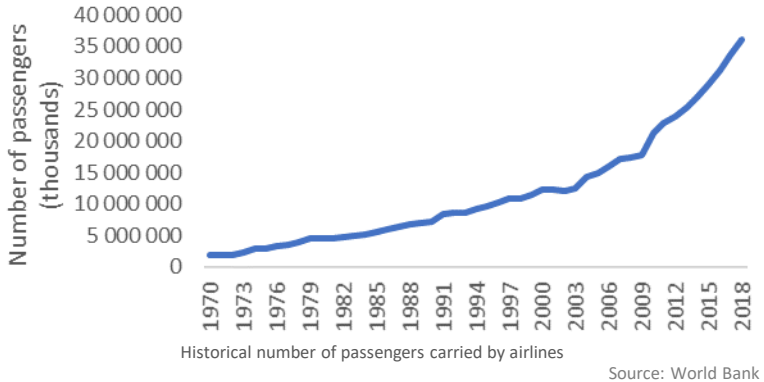
The increase in passengers over the years is a result of the decrease in prices due to deregulation and increased competition

Customers & demand

Historical evolution of demand

- Deregulation in the aviation industry around the 1980s in the U.S. and 15 years later in the European Union, meant that regulations concerning market access, capacities and prices were abandoned
- Customers benefited from lower prices and a rise in number of flights and connections resulting in more options for customers due to increased competition
- The emergence of the first LCCs at the end of the 20th century started a price competition
- Air transportation became more affordable resulting in the demand growth shown below

Demand has increased at a steady rate with the last few years experiencing higher growth rates:



Historical number of passengers carried by airlines

Source: World Bank

Customer segments and preferences according to Teichert et al.'s study

Efficiency

- Relatively low-price sensitivity
- Punctuality, flexibility and schedule are the most important features for choices in this segment
- Decision and booking of flights is outsourced for business reasons
- Travel frequency: several times per week
- Demographics: customers with university degrees and working in leadership roles

Comfort

- Very low price sensitivity
- Decision and booking of flights for business and leisure trips are usually made by travel agencies
- Do not use the internet as a booking medium
- Travel frequency: several times per month
- Demographics: elderly customers who work in high-ranking positions

Price

- Very price sensitive
- Planning of trips is done in advance to obtain the cheapest prices
- Not interested in in-flight services
- Travel frequency: 2-4 times a year
- Demographics: at least a high-school educational background and are lower-to-middle management employees

Performance

- Price is important as well as efficiency
- Customers base their choice on a mixture of price and quality
- Extensive research on travel portals
- Book flights by themselves
- Travel frequency: 5-7 times a years
- Demographics: entrepreneurs and lower-to-middle management employees

Sources: [2] Wittmer et al.; [4] MarketLine; [11] Teichert et al.; [12] World Bank

1B. FSC customers look for reliability and comfort with travel agencies organising their travel plans…

Demand for FSCs is increasing at a higher rate than the rise in supply measured by the number of available seats

Customers & demand

FSC customers according to Teichert et al.:

Efficiency:

- Business travellers who cannot afford travel delays and seek the fastest route to their destination. May travel in business class
- Leisure travellers who can afford the services provided by FCCs

Comfort:

- Leisure travellers who seek a comfortable trip with the best service

Customer journey

Planning | Booking | Purchase | Pre-trip | Departure | In-flight | Post-trip

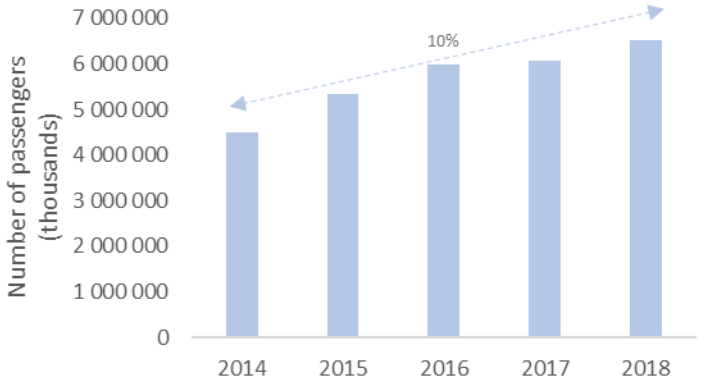
Travel agency

- Planning, booking, purchase and pre-trip check-in are usually outsourced to travel agencies
- Purchase is done directly through the travel agency with the payment of a commission
- Travel agencies can also send pre-trip reminders of the day, time and gate of the flight

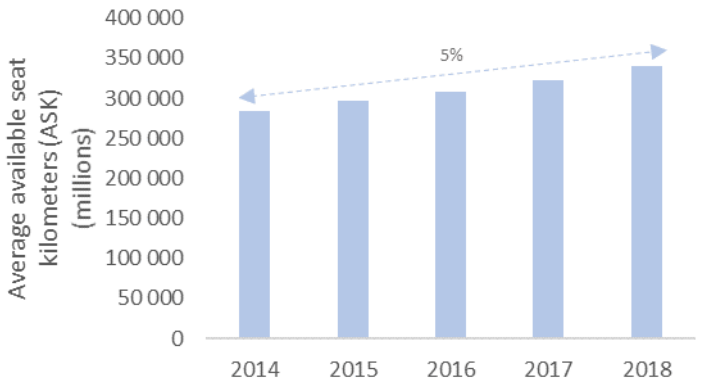
Customer

- Customer ultimately only needs to go through the boarding process and enjoy the services offered by the airline
- Post-trip the customer may review his/her experience based on reliability and comfort

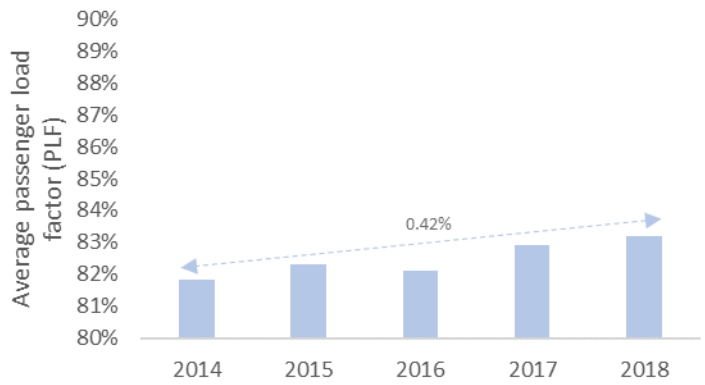
Passenger load factor (PLF) is increasing over the last 5 years, since the increase in demand (passengers) is greater than the increase in supply (ASK):



Historical number of passengers carried by FSCs (average of key players)



FSCs historical average available seat kilometres (average of key players)



FSCs historical average passenger load factor (average of key players)

Sources: MarketLine & Annual Reports

Sources: [4] MarketLine; [7] Annual Reports; [11] Teichert et al.; [13] ICAO

…while LCC customers are price conscious since they organise and book their flights themselves

The demand for LCCs is growing at a higher rate than FSCs as well as having a better utilization of the available seats in each aircraft

Customers & demand

LCC customers according to Teichert et al.:

Price:

- Leisure travellers who pay for the travel expenses themselves and look for the cheapest option to their destination

Performance:

- Leisure travellers who also seek a cheap solution, however, are also willing to pay extra for on-time flights and the necessary connections without having to change airline to reach their destination
- Business travellers with a limited budget

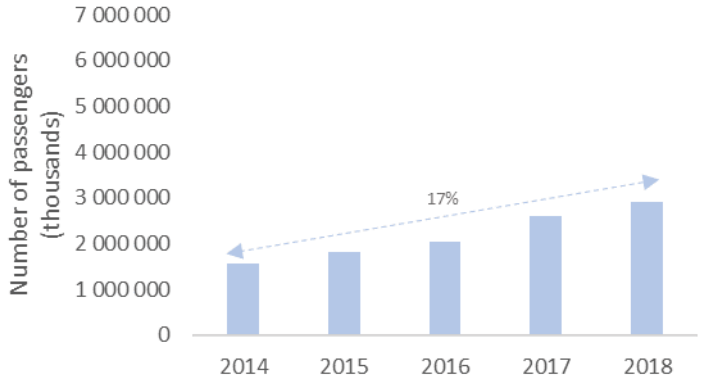
Customer journey

Planning → Booking → Purchase → Pre-trip → Departure → In-flight → Post-trip

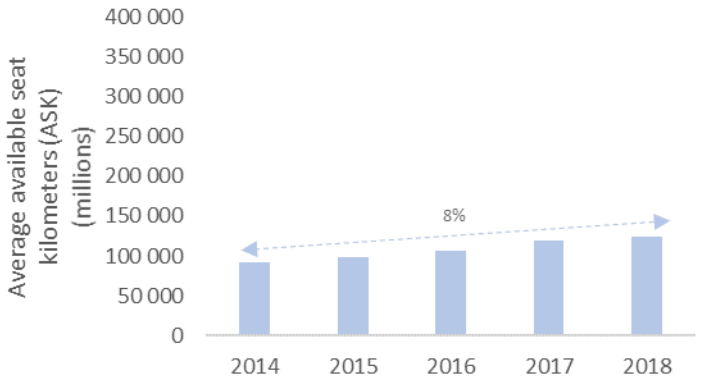
Customer

- Since these customers are price sensitive they might opt to not rely on a travel agency and as such go through the whole process themselves
- For planning and booking, aggregator websites are used to find the cheapest option as well as travel websites to find out the best route
- Purchase can be done directly through the airline's website at designated booking stands
- Little to no services offered by the LCC during the flight
- Post-trip the customer may review his/her experience based on price and performance

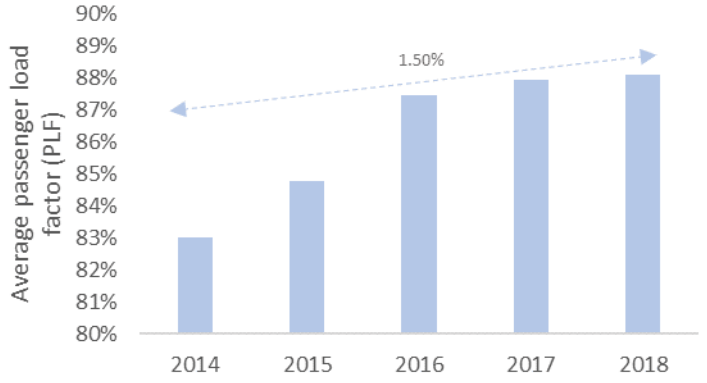
Compared to FSCs, LCC demand, supply and PLF is increasing at a higher rate representing the growth in the LCC segment over the last 5 years*:



Historical number of passengers carried by LCCs (average of key players)



LCCs historical average available seat kilometres (average of key players)



LCCs historical average passenger load factor (average of key players)

Sources: MarketLine & Annual Reports

Sources: [4] MarketLine; [7] Annual Reports; [11] Teichert et al.; [13] ICAO

1B. FSCs follow differentiated marketing through the high quality and number of services offered…

Strategies for FSCs include improving customer service, offering several services, implementing a strong brand and forming alliances

Marketing strategies

Marketing strategy

Differentiated marketing:

- A market-coverage strategy in which an airline decides to target several market segments and designs separate offers for each
- Two travel classes: economy and business class
- FSCs advocate that they offer superior value

Value proposition:

- "More for more" value proposition is implemented by FSCs providing upscale services and charging a higher price to cover the higher costs

American and European FSCs charge higher prices for their increased reliability:

FSC key players perceptual map in terms of price and on-time performance (OTP)

Strategies to implement differentiated positioning

Innovation

- Airlines are constantly looking for ways to improve not only their operations in efforts to become more cost efficient but also their services through innovative features
- Example: China Eastern Airlines is developing a service that will allow customers to give better instructions and feedback on their in-flight meals. Through AI, the airline can better ensure that the tastes and preferences of its customers are kept safe, analysed and applied in the future

Service

- FSCs carry out service differentiation when claiming that they offer several in-flight services as well as punctual and flexible travel
- Example: Lufthansa operates over 60 airport lounges around the world. These lounges are typically only accessible to business class passengers or premium members of the airline. This is a luxury service which Lufthansa provides to passengers so that they can wait for their flights in a more comfortable fashion

Branding

- Customers may perceive a difference between two competing offers based on company or brand image
- Example: In 2019, Delta Air Lines was the most valuable airline brand in the world with a brand value of $10 105 million. This leading brand value is achieved through Delta's strong culture, enthusiastic employee base and strong business outlook

Alliances

- FSCs are usually part of an alliance composed of several airlines which can greatly benefit its members through economies of scope
- Alliances are formed through: code sharing and mergers
- Example: Lufthansa founded the Star Alliance to strengthen its network and benefit from economies of scale, scope and density to compete with LCCs

Sources: [7] Annual Reports; [14] OAG; [15] Cheramakara; [16] Qu; [17] W20

…while LCCs follow cost leadership which is achieved by constantly pursuing operating cost reductions

Strategies for LCCs include operating a single aircraft type, secondary airports, reducing aircraft turnover and offering limited services

Marketing strategies

Marketing strategy

Cost leadership:

- A market-coverage strategy in which an airline goes after a particular market segment
- This is achieved by offering low prices which attract the price and performance customer segments

Value proposition:

- "Less for much less" value proposition is implemented by LCCs meeting customers' low quality requirements at a much lower price

LCCs globally are similar when it comes to customer efficiency with Asian airlines offering the cheapest price:

LCC key players perceptual map in terms of price and on-time performance (OTP)

Strategies to implement cost leadership positioning

Low fleet cost

- LCCs typically operate a single aircraft type
- This significantly decreases maintenance and training costs
- Example: Ryanair only uses the Boeing 737-800 in its aircraft fleet and as such the crew only needs to be trained to operate this type of aircraft and the maintenance is the same for the entire fleet

Low landing fees

- LCCs typically use secondary airports which charge lower fees
- There is less traffic congestion and as a result fuel consumption is minimized
- Example: EasyJet uses the Luton Airport as its London airport. Even though this is a secondary airport and is further away from the city centre than Heathrow Airport it charges lower fees making it cheaper to operate for the airline

Aircraft utilisation

- Heavy emphasis on cost reduction
- Since money is only made when the plane is being operated, turnaround times are reduced to limit the time of the aircraft on the ground
- Example: JetBlue Airways employees usually have multiple jobs. Air stewardesses can also work at the boarding check and as a result the airline saves on employee costs since a role typically done by two employees is done by only one

Limited onboard services

- Checked bags or carry-ons are costly to process at the airport so they are paid in advance (when purchasing flight tickets)
- There is no assigned seating
- No onboard meals since it is costly to stock them and increases aircraft weight
- Example: Southwest Airlines uses its no assigned seating policy to promote that customers can choose where to sit

Sources: [7] Annual Reports; [14] OAG; [15] Cheramakara; [16] Kotler et al.

1C. FSC average price is $112 more expensive but flights are not more reliable compared to LCCs

LCCs need to make Efficiency customers aware that their needs are better satisfied by their services to gain market share

	Full-service carriers (2018)	Low-cost carriers (2018)
Average price	$202.00	$90.16
Network configuration	Hub-and-spoke & multi-hub-and-spoke	Point-to-point
Fare structure	Two travel classes: business and economy	Single travel class
Services	Several included in-flight services	Very limited included in-flight services
Customer segments	Efficiency and Comfort	Price and Performance
Strategy	Differentiation	Cost leadership
Revenues (billion)	$477	$205
Average ASK (millions)	339 647	124 279
Average PLF	83.2%	88.1%
On-time performance	74.82%	75.62%
Key players	American Airlines, Delta Air Lines, Lufthansa, Air France-KLM, Air China, China Eastern Airlines	Southwest Airlines, JetBlue Airways, Ryanair, EasyJet, IndiGo, Air Asia Berhad

FSCs are on average more expensive than LCCs, however, they are not more reliable, which contradicts Teichert et al.'s study. As such, if no connections are needed and both FSCs and LCCs have exactly the same flights, the LCC will better satisfy the needs of a customer from the Efficiency segment. Hence, if LCCs can make these customers aware that their flights offer a better deal, then LCCs will continue to gain market share from FSCs.

1C. Porter's Five Forces analysis main conclusion is that airline bottom line is squeezed due to powerful suppliers

The establishment of LCCs in the market and the low switching costs for customers are other disruptive forces within the aviation industry

Threat of new entrants

- Limited incumbency advantages
- Demand-side benefits of scale
- Easy access to distribution channels

Threat of substitutes

- The number of customers who can afford air travel is increasing, especially in emerging markets
- Web-conference technology is improving
- Time consuming security measures make trains a short-haul competitive alternative
- Travel can be delayed or done without airlines
- Environmental issues challenge air travel

Medium

Competitive rivalry

- **Multiple direct and indirect rivals**
- Growth has been rapid but volatile
- Limited product differentiation; similar company structures
- Low marginal costs per passenger since there are high sunk costs per aircraft
- Limited economies of scale
- Significant exit barriers

Medium

High

Bargaining power of suppliers

- **Aircraft and engine producers are both concentrated oligopolies**
- **Airports have significant power since they are local monopolies**
- Operations at network hubs are controlled by powerful labour unions
- A small concentrated number of firms provide airport services (handling, catering and cleaning), but switching costs are low

High

Bargaining power of customers

- **Low switching costs for most customers**
- Buyers are fragmented
- Air travel is viewed as a standardized product
- Travel is a meaningful share of discretionary spending and as such customers tend to be price sensitive
- Websites increase price transparency

→ **To understand why suppliers have so much power over commercial airlines it is necessary to analyse the industry value chain and respective operations**

Sources: [17] IATA

Appendix

Aviation glossary

ASK	Available Seat Kilometer: the measure of a flight's passenger carrying capacity. Calculated by multiplying the number of seats on an aircraft by the distance travelled in kilometres. Used to measure an airline's capacity to transport passengers
FSC	Full-service carrier: an airline that focuses on providing a wide range of pre-flight services, including different service classes and connecting flights
FTK	Freight tone Kilometers: the equivalent of RPK for freight. One FTK is one metric tone of revenue load, carried one kilometer. The sum of FTKs for every segment flown by every aircraft over a specific period is the FTK of an airline over that period
HS	Hub-and-spoke network configuration: destinations are linked to a main airport called a hub
LCC	Low-cost carrier: an airline that is operated with a especially high emphasis on minimizing costs and without some traditional services and amenities provided in the fare, resulting in lower fares and fewer comforts
Long-haul	Flights lasting more than 6 hours
Medium-haul	Flights lasting between 3-6 hours
OTP	On-time performance: flights that arrive or depart within 15 minutes of their scheduled arrival/departure times
PLF	Passenger Load Factor: is a measure of how much of an airline's passenger carrying capacity has been utilized. It is calculated by dividing the RPK by the ASK. A higher passenger load factor therefore means that there are less empty seats on each aircraft
PP	Point-to-point network configuration: airports are connected by direct routes rather than through a general hub
RPK	Revenue Passenger Kilometers: shows the number of kilometers traveled by paying passengers. It is calculated as the number of revenue passengers multiplied by the total distance traveled
Short-haul	Flight lasting between 30 minutes to 3 hours

Sources: [20] CAPA

Appendix

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A Work Project, presented as part of the requirements for the Award of a Master's degree in Finance and Management from the Nova – School of Business and Economics.

Scalability: a new challenge for the future

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3rd of January, 2020

A Project carried out on the Master in Finance and Management under the supervision of: Professor Miguel Pita

Why are airlines destroying shareholder value and how do they contribute to the world economy?

Abstract

1. Which segment is the main driver of the aviation industry and what are the characteristics of full-service and low-cost carriers?

2. Why is the aviation industry destroying shareholder value?

3. What are the spillovers of the aviation industry?

4. Scalability: a new challenge for the future

Keywords: scalability, growth drivers & customer journey

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Scalability: a new challenge for the future

Executive summary

4A. Drivers of growth

- Global population is expected to reach 8.7 trillion people in 2035, followed by an increase in global GDP and global trade
- The aviation industry will need to quickly adapt to the constant changes in the market and face new and exciting challenges
- The number of international passengers is expected to reach 7.3 billion by 2035 and the industry is expected to generate up to 30 million jobs
- Commercial passenger airlines have several profitability and scalability problems that can be solved by enhancing the customer journey

4B. Capacity concerns within the industry

- Infrastructure barrier can be surpassed with three measures
- Labour barrier can be solved by forming 617 000 pilots, 679 000 technicians and 814 000 cabin crew workers
- Fleet barrier can be surpassed by increasing load factor and overall capacity

4C. Customer journey analysis

- A customer journey overhaul can solve profitability and scalability issues and enhance the customer experience
- Customers want more transparency when it comes to booking and destination selection
- Customers want a smooth and quick transition from arriving at the airport to boarding the aircraft
- Customers want to continue connected to the outside world during their flight

To keep up with an increasing demand of air transportation services, the aviation industry needs to expand its fleet, infrastructures and labour requirements. A focus on the customer journey is expected to simultaneously help solve the profitability and scalability issues of the industry and enhance the customer experience.

4A. Global population, income, GDP and trade are macrotrends impacted by the aviation industry in the future

Global population is expected to reach 8.7 trillion people in 2035, followed by an increase in global GDP and global trade

Global population and income class

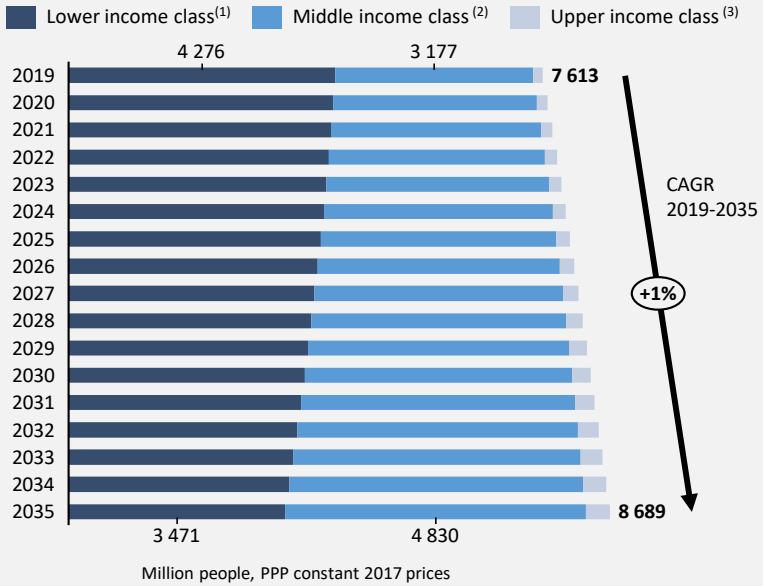
- Over the next 16 years, world population is expected to grow at a CAGR of 1%, reaching almost 8.7 trillion of people in 2035
- The number of people in the middle and upper income classes are expected to increase, therefore, increasing the number of flights demanded since they have a higher average number of trips per year when compared to people in the lower income class

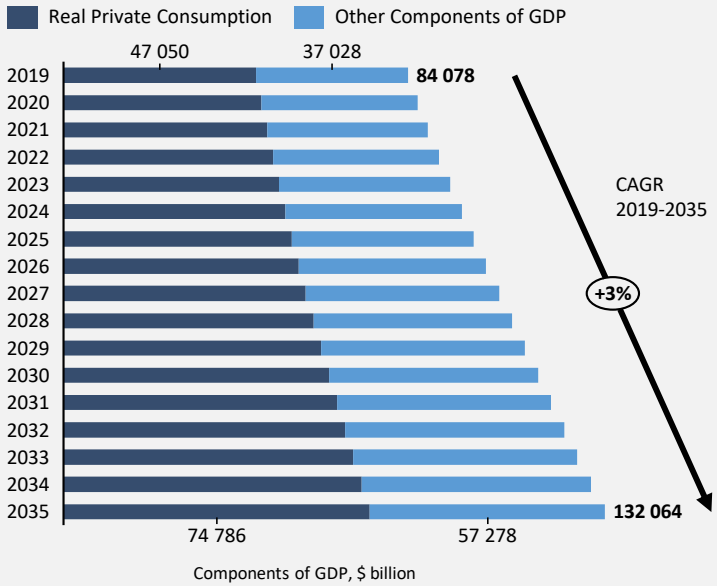
Global GDP

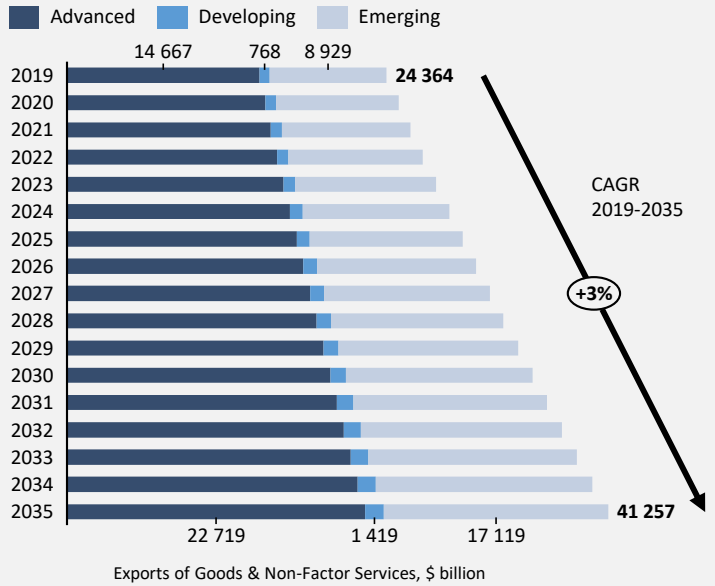
- Real private consumption (consumers' spending on goods and services) is expected to reach just under $75 trillion in 2035, accounting for more than 50% of global GDP
- Aviation will be one of the main drivers of this growth, generating jobs and driving consumption. Together with other components, global GDP is expected to grow at a CAGR of 3% from 2019-2035

Global trade

- The value of exported goods and non-factor services is expected to almost double until 2035. Developing and emerging markets are the main drivers of this expansion, growing almost 85% and 92%, respectively, from its 2019 value
- The aviation industry will be an important stakeholder, facilitating the transportation of freight and goods worldwide







(1) Household income <$20,000; (2) Household income $20,000-$150,000; (3) Household income >$150,000

Sources: [1] IATA; [2] Airbus

4A. Society, economy, technology and environment are the main drivers of change for the aviation industry

The aviation industry will need to quickly adapt to the constant changes in the market and face new and exciting challenges

Society and Economy

New modes of consumption

- Consumers' behaviour towards consumption has shifted over the last few years, from a one-size fits all to a more authentic and personalized experience
- In addition, consumers are more aware of their environmental footprint and look for a sustainable consumption. Aviation is the perfect example of an industry that must adapt in order to offer customers what they want

Price of oil

- The future outlook for crude oil prices is somewhat uncertain. Lower prices may drive initial cost savings for the aviation industry, but the impact on global economy can be tragic
- Alternative fuels and energy sources are a real threat, as they might completely replace oil in the long term

Global population growth and global economy

- A growing population and economy will likely lead to a growing demand for the services provided by the aviation industry – freight and passenger transportation

Technology and Environment

New aircraft designs and configurations

- Several investments have been made in R&D in hope that breakthrough designs bring fuel savings (e.g. Flying-V, an aircraft design that promises 20% fuel savings when compared to the Airbus A350)
- Different airplane configurations have been tested to face the changing customer needs and wants

Alternative fuels and energy sources

- Alternative fuels and energy sources completely change how businesses and people consume energy
- Traditional fuels used by the aviation industry can be replaced by bioenergy or fuel cells and recent technological advances in energy storage will likely favour the growth of renewables worldwide

International regulation of emissions and noise pollution

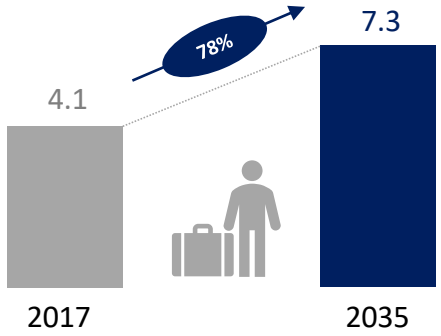
- Even though CO_2 emissions from the aviation industry have been increasing, its contribution is still low when compared to other transportation sectors (such as road transportation)
- The CORSIA deal and monitoring plans along with technological improvements will contribute to the process of lowering industry emissions

Sources: [1] IATA; [3] KLM

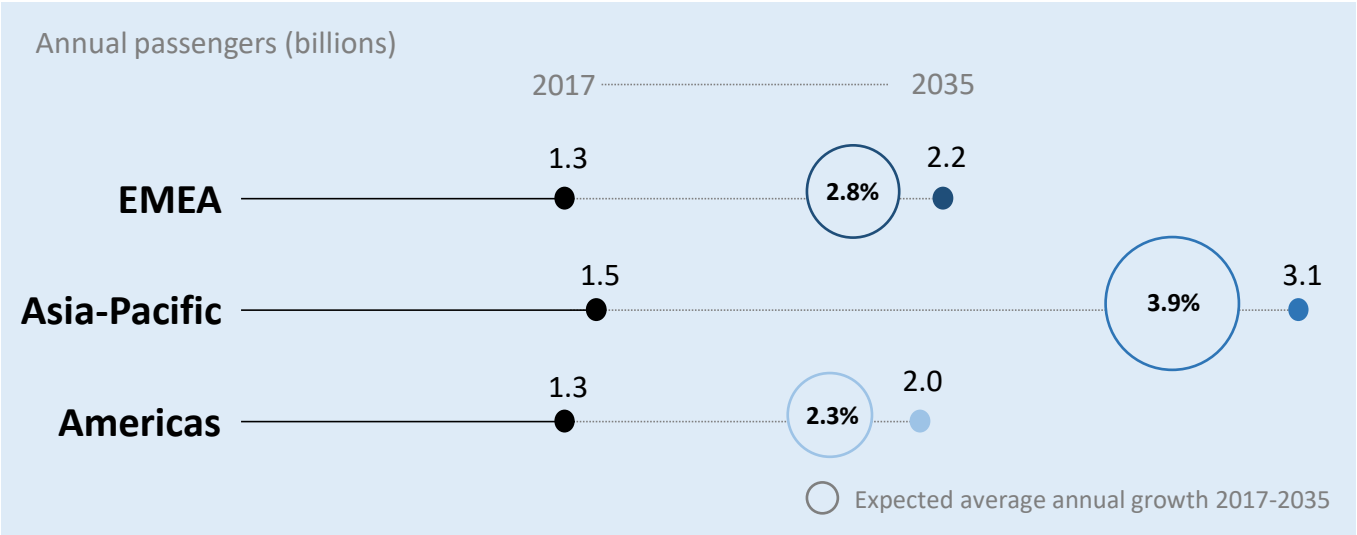
4A. Demand for air transport is expected to increase, generating new jobs and driving private consumption

The number of international passengers is expected to reach 7.3 billion by 2035 and the industry is expected to generate up to 30 million jobs

The number of international airline passengers is expected to increase 78% by 2035



- By 2035, the number of international airline passengers is expected to reach 7.3 billion, representing an increase of almost 80% when compared to the 4.1 billion passengers in 2017
- The Asia-Pacific region will be a key driver in this growth and is expected to more than double its number of international air passengers by 2035



In the next few years, there will be a lot of demand for commercial planes to keep up with an increasing number of international air passengers in the aviation industry

Global Commercial Fleet Projections

22 730
Additional aircrafts

The Asia-Pacific region will need two out of every five planes

Employment generated by the industry

An increasing global commercial fleet will lead to an increase in the workforce (e.g. crew, operators, technicians) to fly and maintain the airplanes

New jobs directly generated by the industry in 2035

2 110 000

Pilots	Technicians	Cabin crew
617 000	679 000	814 000

Together, aviation and the tourism industry are expected to generate between 20 million to 30 million new jobs by 2035 (direct, indirect and induced jobs)

Sources: [4] National Geographic

4B. Profitability and scalability are the main challenges the industry will need to address

Commercial passenger airlines have several profitability and scalability problems that can be solved by enhancing the customer journey

Challenges the aviation industry needs to address	Main drivers
1. Profitability	Threatening forces
	Volatile cost structure
	Strategic decision
	Legislation
2. Scalability	Infrastructure
	Labour
	Fleet

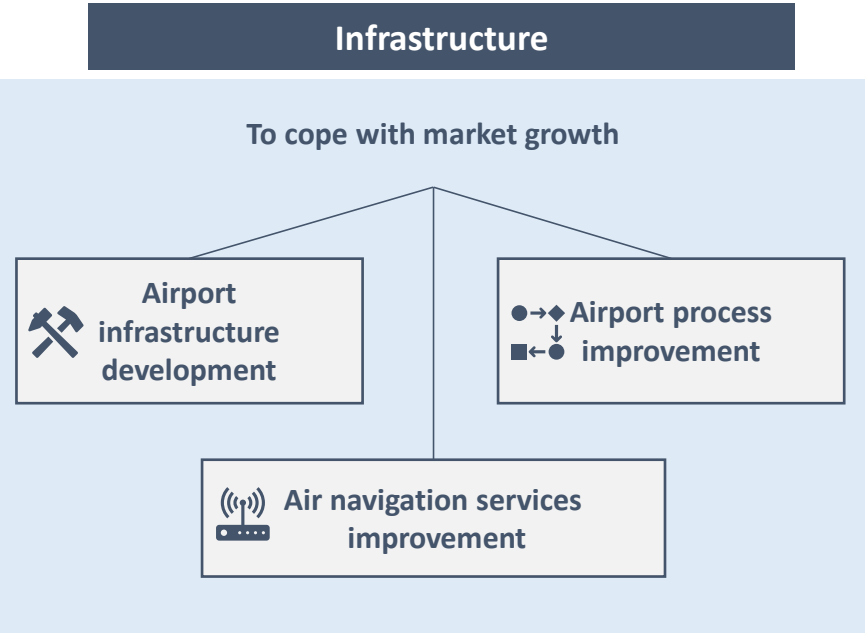
Solution

Customer journey

By analysing the industry through another perspective, both problems can be mitigated

4B. Infrastructure barrier can be surpassed with the help of three measures

Secondary airports are taking advantage of capacity pressure in nearby large airports by absorbing new demand



Airport infrastructure development

- Up to 2030, an investment of around $1.2 – 1.5 trillion is expected to be necessary for global infrastructure to keep up with the increasing air travel demand
- Investment will be used to build and improve runways and terminals so that cost-efficient facilities can balance capacity with demand
- LAX is implementing three projects for improving access to the airport, terminals and gates

Airport process improvement

- By improving airport processes idle time is reduced
- RFID use on checked baggage, biometric boarding, RFID use on passengers and advanced sensing cameras are some of the technological advances airports are capitalizing on to improve processes

Air navigation services' improvement

- Air navigation services' improvement is the most difficult barrier to surpass due to the need of bringing all stakeholders to agree on a solution
- ICAO is proposing a new methodology – Aviation System Block Upgrades – that aims at harmonizing circulation, increasing capacity and improving environmental efficiency

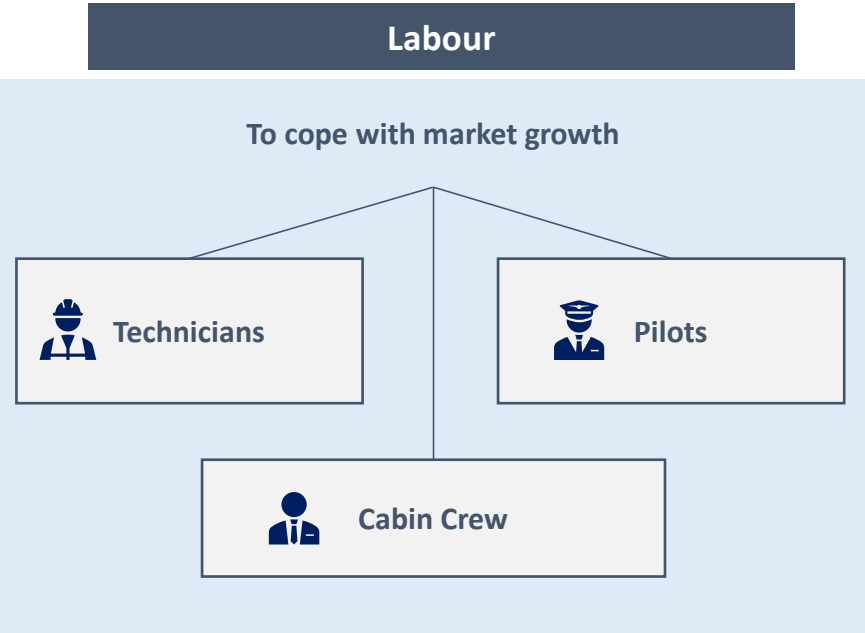
How is new demand being absorbed now?

- Increasing passenger growth is pressuring infrastructure and causing congestions
- Secondary airports are growing by capturing new demand from nearby airports
- Process optimization is also responsible for absorbing growing demand for air transport services by freeing time that was previously wasted

Sources:
[5] Airports Council International; [6] Iata Economics
[7] ICAO

4B. Labour barrier can be solved by hiring 617 000 pilots, 679 000 technicians and 814 000 cabin crew workers

In the short-term there might be skill supply problems due to the demand in emerging markets



Technicians

- Technicians are highly-skilled workers who need a lot of knowledge to perform their jobs
- In the medium-term, there might be a shortage of skills supply due to the demand increase
- To have the required amount of professionals, the industry will need to invest in technology to accelerate the hiring process
- Aviation will need to hire about 679 000 technicians until 2035

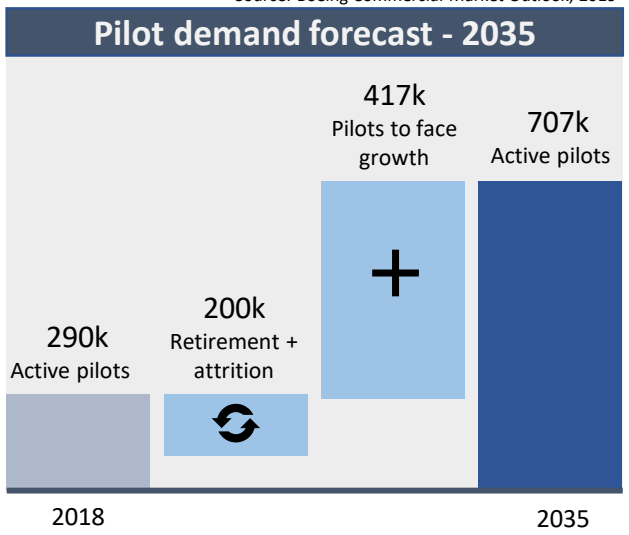
Cabin crew

- Cabin crew workers are the fastest to hire but a larger number of people will be needed
- Industry needs to position aviation as a desirable career path to attract candidates
- In the medium to long term, technological advances will enable the automation of many functions and decrease the size of the workforce
- Aviation will need to hire about 814 000 cabin crew members until 2035

Pilots

- Increasing competition in pilot labour market due to traffic increase creates a big challenge regarding recruitment and talent retention
- Emerging markets pulling high percentages of labour
- Mandatory retirement age of 65 imposed by most regulators
- Retirements and attrition is estimated at around 3% per year

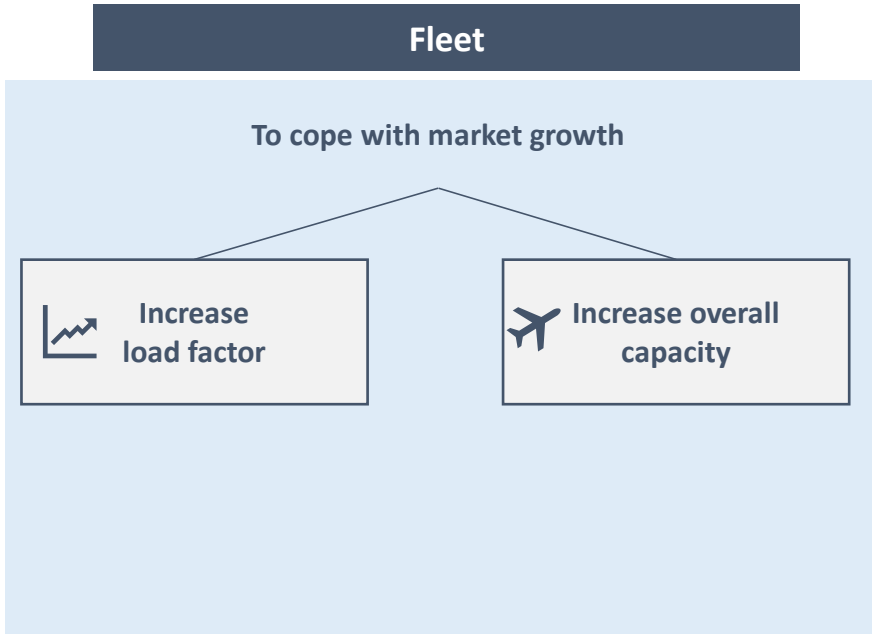
Source: Boeing Commercial Market Outlook, 2019



Sources:
[8] CAE; [9] Boeing

4B. Fleet barrier can be surpassed by increasing load factor and overall capacity

A new fleet of more efficient airplanes will substitute the majority of today's active fleet delivery capacity to face growth concerns



Increase load factor

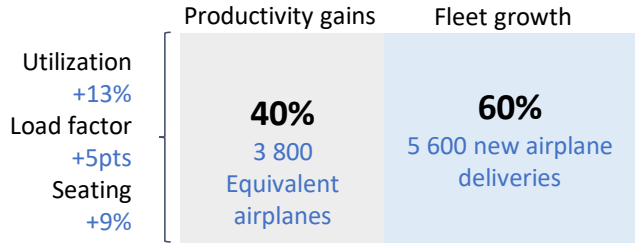
- Load factor reflects the percentage of available seats that is occupied by passengers. To increase it, airlines need to attract and transport a higher number of passengers
- Load factors are at all-time high levels of 82.1%, according to IATA. Increasing it will become more difficult in the near future

Increase overall capacity

There are three ways to increase overall capacity:

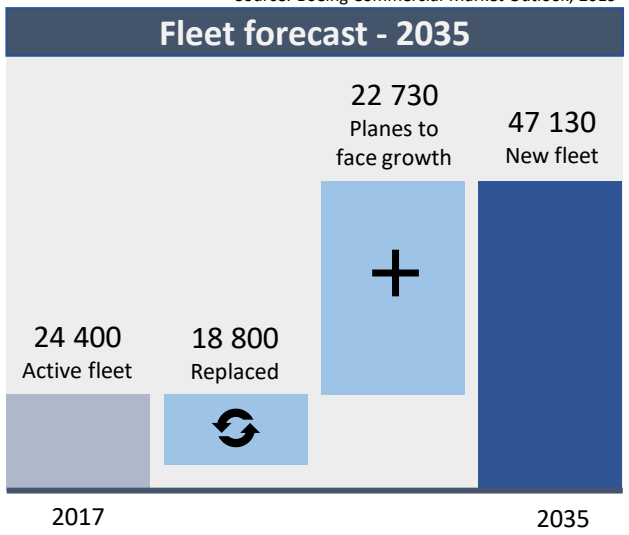
1. Increase the number of planes
2. Increase the number of hours flown by plane per day
3. Increase the total number of seats per plane by upgauging and increasing cabin densification: smaller leg room, smaller seats, smaller corridors, smaller toilets, *etc.*

RPK growth absorbed by productivity gains and fleet growth (07-17)



Source: Boeing Commercial Market Outlook, 2019

Source: Boeing Commercial Market Outlook, 2019



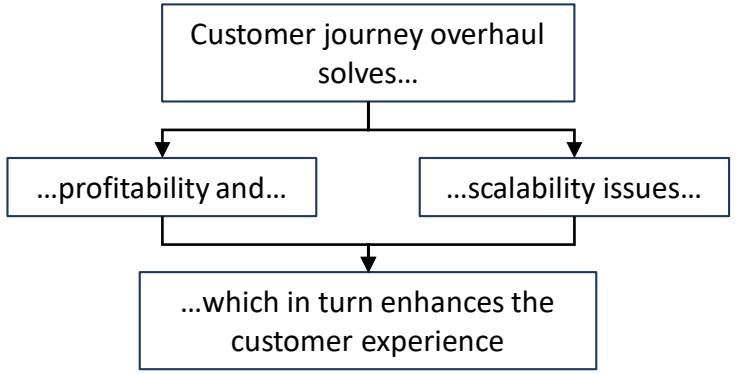
Sources:
[2] Airbus; [10] Eurocontrol; [11] Boeing

4C. A customer journey overhaul can solve profitability and scalability issues and enhance the customer experience

The airline customer journey is composed of seven phases which have distinct characteristics and contribute to the travel experience

How to solve profitability and scalability issues?

- As previously discussed, the commercial passenger airline industry has severe profitability and scalability problems
- One way to solve both of these issues would be through the overhaul of the customer journey
- The current customer journey can be enhanced mainly through the implementation of innovative technologies
- Profitability and scalability problems can be solved by making the customer journey more efficient resulting in cost cutting for airlines
- Additionally, an overhaul of the customer journey will also simultaneously improve the customer experience



Customer journey

Planning → Booking → Purchase → Pre-trip → Departure → In-flight → Post-trip

Planning:

This is the first phase of the airline customer journey where the traveller decides where to go and researches on the possible flights and connections which might be necessary to reach the destination

Booking:

In this phase the customer will compare the prices of the several options identified in the previous phase as well as the different services provided, ultimately, choosing the options that satisfies best the customers' preferences

Purchase:

After identifying the best option for the customer the next step is the purchase of the flight tickets which can be done online or at a designated airline ticket stand where payments can be done in cash or via credit/debit card

Pre-trip:

This phase consists on preparing for the day of the flight which includes activities such as packing and booking a transport to the airport, if necessary

Departure:

Includes the checking-in at the airport, checking baggage if necessary, going through passport and security screening as well as boarding the aircraft

In-flight:

This phase is the actual flight to the destination where the customer can enjoy several included or paid services

Post-trip

This is the last phase of the airline customer journey where the passenger evaluates and provides positive or negative feedback regarding their flight experience

Sources: [12] Dent

4C. Customers want more transparency when it comes to booking and destination selection

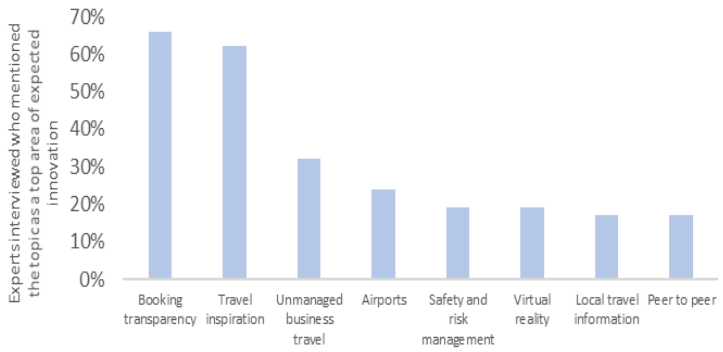
These frictions can be reduced through the use of AI, NDC, digitization and personalized services to meet specific customer needs

Frictions

Planning, booking, purchase and pre-trip:

- These four phases can be joined together since they all represent the customer journey before the passenger arrives at the airport
- In the past few years there have been efforts to increase searching and booking transparency by travel providers and aggregator websites
- Customers still struggle to find information on attributes other than price and to know when is the best time to buy flight tickets to get the best deal

Booking transparency and travel inspiration are the most likely to undergo innovation:



Experts interviewed by BCG on areas of expected innovation in the airline customer journey

Source: Becker et al.

Customer journey

Planning → Booking → Purchase → Pre-trip → Departure → In-flight → Post-trip

Artificial intelligence in travel recommendation

- Customers suffer from information overload and struggle to find information tailored to their needs
- Travel recommendation engines are using AI to extract useful information from millions of travel products and thousands of global destinations
- E.g. WayBlazer uses IBM cognitive computing technology to provide a 23% shorter path to booking and 81% quality increase in search results

New Distribution Capability (NDC)

- NDC is a travel industry-supported program launched by IATA which enhances the capability of communications between airlines and travel agents
- FSCs and LCCs can differentiate their products
- Aggregators and travel agents have access to full and rich air content of the airlines
- Corporate buyers and travellers benefit from a transparent shopping experience

Digitization

- Digitization technologies can increase customer satisfaction scores up to 10 percentage points
- Reduces costs by stream-lining and automating processes for savings of up to 10% in affected areas
- Increases revenues up to 10% by helping airlines generate deeper insights into customer preferences
- Decreases lead times needed to release new features for apps by up to 80%

Features tailored towards business travellers

- Few, if any, search and booking tools are tailored for the business traveller resulting in unmet needs
- Business travellers are the main users of airlines' mobile app, however, most airlines don't adapt them to their specific preferences
- Beneficial features include helping them to get out of airports quickly and making flight changing easier
- Instead, airlines focus on social media integration

Sources: [13] Boutin et al.; [14] Becker et al.; [15] IATA

4C. Customers want a smooth and quick transition from arriving at the airport to boarding the aircraft

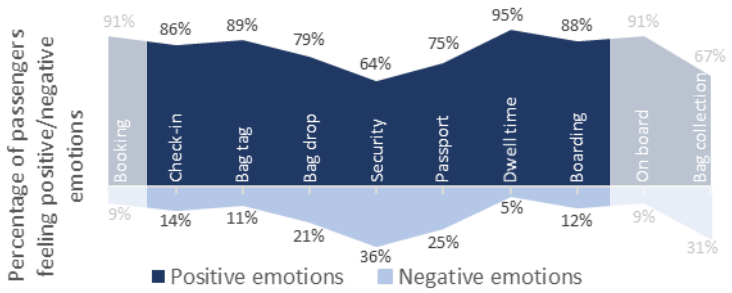
These frictions can be reduced through RFID and biometric technology as well as advanced sensing cameras

Frictions

Departure:

- Departure is defined as the moment the customer arrives at the airport until he / she is boarded on the aircraft
- As a result of the September 11 attacks in 2001, security at airports worldwide was escalated to prevent future terrorist plots
- Changes in airport security included: improved security on aircraft, improved security screening and identification checks
- Increased security meant that it took longer for customers to go through the departure phase

Security screening is where more passengers experience negative emotions in departure:



Emotional extremes during the airline customer journey (2016)

Source: SITA

Customer journey

Planning | Booking | Purchase | Pre-trip | **Departure** | In-flight | Post-trip

RFID use on checked baggage

- In 2018, approximately 6 bags were mishandled per thousand passengers and 46% of the times it is due to a transfer mishandling, costing the global airline industry $2.4 million
- RFID technology has led to a reduction of more than 70% of baggage mishandling in a 3 years Baggage Improvement Program

RFID use on passengers

- Up to 5% of aircraft airport delays are caused by late passengers or late bags at the gate
- OpTag system enables the immediate location of checked-in passengers who are either missing or late, reducing passenger-induced delays and speed up aircraft turnaround
- Improves airport efficiency, security and safety

Biometric boarding

- Self-service boarding gates which use facial-recognition technology
- Customers simply look into a camera prior to boarding, have their biometric data verified and then walk on to the plane
- Improved punctuality on domestic flights by 10% according to British Airways trial

Advanced sensing cameras

- Scientists from the Australian National University have invented a device with advanced sensing functions
- Cameras which can identify hazardous devices or dangerous chemicals in passengers' carry-on baggage when they walk through an airport
- Expedites passenger processing at airports and helps reduce waiting times

Sources: [14] Becker et al.; [16] SITA; [17] Swedberg; [18] Lloyd et al.; [19] Cooper; [20] Airport Technology

4C. Customers want to continue connected to the outside world during their flight

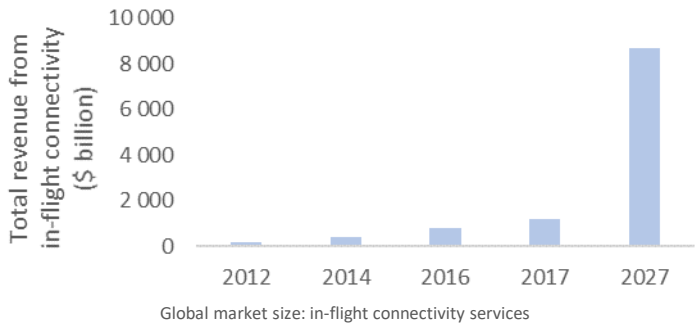
This friction can be reduced through IFC, on-board Wi-Fi access, a BYOD environment and offering an end-to-end customer experience

Frictions

In-flight:

- In-flight is defined as the moment the customer enters the aircraft in the airport of origin until he / she leaves the aircraft at the airport of destination
- Services related to passenger experience includes those services needed to maximise their flight experience
- Includes: cabin upgrades, cabin crew training, in flight entertainment (IFE), connectivity and booking
- Over the next 20 years this market is expected to represent a cumulative $1.1 trillion

In-flight connectivity revenues are expected to increase by $1.5 billion from 2017 to 2027:



Global market size: in-flight connectivity services

Source: Vanleynseele et al.

Customer journey

Planning | Booking | Purchase | Pre-trip | Departure | **In-flight** | Post-trip

In-flight connectivity (IFC)

- Emergence of smartplane concept
- Connected aircraft is a solution to answer passenger needs and give airlines' flight crews better significant benefits in the ways these can be met
- E.g. possibility of ordering food from your seat
- Cabin upgrade market is forecasted to represent $270 billion in 2038

Bring your own device (BYOD)

- A BYOD onboard environment allows airlines to offer passengers a benefit they have become accustomed to paying for
- This would be further enhanced with the availability of in-flight Wi-Fi
- Reduces in-flight entertainment costs as well as aircraft weight

In-flight Wi-Fi

- In-flight Wi-Fi is one of the customers' most requested services with 81% of passengers worldwide saying that they would use in-flight Wi-Fi if it were available in their next flight
- Global in-flight Wi-Fi market is expected to represent $5 600 million in 2021

End-to-end customer experience

- Customers expect the travel experience to be just as seamless as online shopping
- Airlines are connecting with passengers to integrate all touchpoint of their travel experience
- E.g. during the flight customers would be able to book a transport to their hotel which would arrive as soon as the flight lands at the airport

Sources: [2] Airbus; [11] Boeing; [21] Vanleynseele; [22] Inmarsat Aviation; [23] Statista

Appendix

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